

 **Product Update**

TDM2/DDM2 Software

On-line computerized monitoring for steady state and transient machinery operating conditions

Safety, economic and production concerns dictate that critical rotating and reciprocating plant machinery be equipped with permanently-installed, continuous monitoring systems. By interfacing directly to the monitor racks, computer-based data acquisition systems can record data consistently. Timely information can then be used effectively for routine predictive maintenance programs and for machinery diagnostics when necessary.

Our first generation Transient Data Manager™ (TDM) and Dynamic Data Manager™ (DDM) Systems have proven valuable under a wide variety of plant applications around the world. Bently Nevada continues to incorporate advanced features at reduced cost, with the introduction of the new TDM2 and DDM2 Software packages.

DDM2 automatically collects and processes data during steady state machine operation. TDM2 offers the additional ability to capture valuable transient (startup and coastdown) machine condition data which provides further insight into machinery operating conditions. Each offers significant enhancements over earlier versions and lower price!

Remote communications

Many users require machinery information at more than one location at a plant site or need to review data from other facilities. Designed for your particular requirements, TDM2 and DDM2 Systems offer three different communication options:

- Ethernet cable allows direct connection of up to ten TDM2 and/or DDM2 host computers. Distance limitations are a function of the type of Ethernet cable used.
- RS-422 cable can be connected from a TDM2 or DDM2 host computer to a remote computer. The maximum distance between host and remote computer is 4000 feet (1200 metres).
- Modems and standard telephone lines offer remote computer connection over long distances (e.g., another city or even another country).

In all of these applications, essentially the same data is available at one computer as is available at the other computer(s).

Networking capability

A single host computer can be connected directly to up to twelve Communications Processors (CPs) by using RS-422 cable and daisy-chaining. The Ethernet network option for computer communications can connect two or more independent TDM2 or DDM2 host computer systems. This can result in up to ten host systems being networked together, making the total system capacity 120 monitor racks. When two or more TDM2 host computers are networked together, data from any of the systems can be viewed from any of the computers.

While TDM2 or DDM2 computer systems may be connected on the same Ethernet cable as other plant or individual computer systems, TDM2 and DDM2 data communications on that network are limited to only the TDM2 and DDM2 computer systems.

Pull-down menu displays

Both software packages are user-friendly and operate in a pull-down menu environment. Menus are logically organized and are easy to follow. The software has been optimized for mouse operation. Should they be needed, help screens for each display level are available at any time.

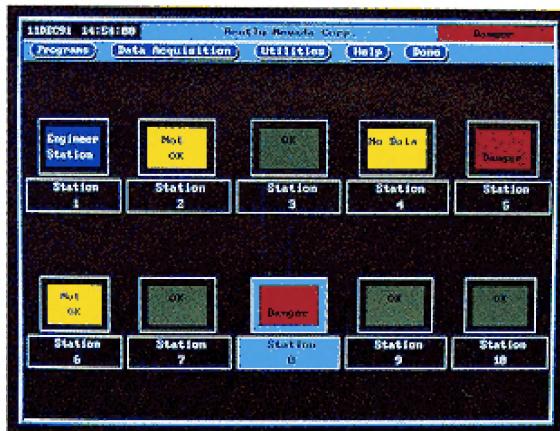
Plot display formats

The following plots can be selected from stored transient or steady state data, from stored Alarm Event Data, or from Reference Data. Current Data can also be selected, in which case the computer requests a current sample from the associated monitor rack and CP:

Current Values provide a numerical list of the present measured values for the point(s) selected.

Bargraph creates a simulation of the monitor front panel displays.

Trend shows the measured values that have been stored (Y axis) as a function of the trend period selected (X axis), i.e., Amplitude and Phase versus Time (APHT). ▶



The top level menu screen is the plant display. This screen shows the status of up to ten TDM2 or DDM2 computer Stations on the network. The pull-down menu environment allows the user to select data from any of the ten systems for display on any Station on the network.

Acceptance Region represents a trend of vibration vector data in polar format (either 1X or 2X) as a function of time.

Timebase represents the time domain waveform in a manner similar to the time dependent (sweep) display on an oscilloscope.

Orbit/Timebase is composed of two plots: (1) the dynamic path (Orbit) of the shaft centerline within the radial bearing clearance and (2) the two (XY) signal waveforms which are used to produce the Orbit.

Shaft Centerline represents, in Polar format, the change in average position of the shaft within the radial bearing clearance as a function of time (TDM2 or DDM2) or rpm (TDM2 only).

Spectrum shows vibration amplitude (Y axis) as a function of vibration frequency (X axis).

Fast Trend for TDM2 with a TDM CP, displays a trend of static samples taken at four-second intervals for the previous twenty minutes. For DDM2 with a Dynamic Data Interface (DDI) CP, the display is static values taken at fifteen-second intervals for the previous ten minutes.

Waterfall (TDM2) is a trend display of Spectrums collected every forty-seconds for the previous twenty minutes.

Bode (TDM2) provides vibration amplitude (overall) or vibration amplitude and phase (1X or 2X) taken at user-selected shaft rotative speed intervals during startup or coastdown.

Polar (TDM2) is a polar graph showing either 1X or 2X amplitude and phase data in vector format at user-selected shaft rotative speed intervals during startup or coastdown.

Cascade (TDM2) is a series of Spectrums taken at user-selected shaft rotative speed intervals during startup or coastdown.

Plant process data

For correlation of machine process variable information with vibration data, the Process Data Manager (PDM) Communications Processor may be installed on the RS-422 daisy chain. TDM2's host computer will collect, store and display data from these process measurements just like any monitor rack signal. Correlation of temperatures, pressures, flows and other external parameters, which could affect machinery operation, is important for overall machine analysis.

Software structure

TDM2 and DDM2 are separate software products. A host computer with

TDM2 Software can be connected to any type of Communications Processor: TDM, DDM, PDM or Dynamic Data Interface (DDI). A host computer with DDM2 Software can be connected only to DDM, PDM or DDI Communications Processors. Three different software modules are available for each TDM2 or DDM2 system:

- **Data Acquisition** - required by those computers connected to monitor racks and CPs. It allows the computer to collect and store data from the monitor racks and CPs connected to it. A Configuration program (included with each Data Acquisition software module) enables the user to set up the data acquisition routine so it will match the plant's layout of machinery trains, transducers and monitor systems.
- **On-site Display** - allows data display from connected monitor racks and CPs and/or from any other TDM2 or DDM2 data acquisition computer on the network.
- **Remote Display** - required by any computer not connected to monitor racks or CPs, but connected to an on-site computer via RS-422 cable or via modems and a telephone line.

Engineer Assist Software

Bently Nevada's new Engineer Assist Software allows expert system-type diagnosis of particular rotating machinery problems. Its analysis is based on actual machine vibration data received directly from an on-line TDM system. As a result, Engineer Assist enhances the value of your TDM system.

Through comprehensive computer screens and hard copy engineering reports, the machinery specialist engineer is assisted in making the best decisions for your company. By including extensive tutorial text to explain how a particular conclusion was reached, this program is also an excellent training tool for new engineers. ■